What is BRT?

Miami-Dade County Transportation Committee Meeting
July 22, 2004

Sam Zimmerman
Principal, Transportation Planning
BRT: Bus Rapid Transit

• Flexible, permanently integrated high performance system with a quality image and a strong ID

• Package of components appropriate to current and future:
  – Markets served
  – Physical environment
BRT System Components

- Vehicles
- Running Ways
- Stations & Terminals
- Systems
- Service Plan
BRT: Infinite Possibilities

Essential Attributes

– Speed
– Reliability
– Identity and image
Stops, Stations and Terminals

- .25 – 1 mile station spacing
- Permanent, substantial, weather protected
- Amenities, passenger information
- Good pedestrian, local bus, auto access
- Safe, secure
- Convey identity and image
- Design integrated with surroundings
Stations Options

Brisbane: SE Busway

Pittsburgh; MLK Busway Ext.
Running Ways

- BRT can operate in broad variety of physical and operating environments, but segregated, dedicated preferred

- Critical planning and design parameters:
  - Ability to safely support rapid, reliable services
  - Safe rapid transit vehicle access
  - Identity, aesthetics
Arterial Bus Lanes, Median Transitway

Boston: Silver Line

Vancouver: 98B
Bus/Transitway on Freeway ROW

Median
Houston: Transitways

Shoulder
Brisbane: SE Busway
Busway on Railroad ROW

Pittsburgh: East (MLK) Busway
Elevated Sections

Runcorn, UK
Tunnels

Brisbane: SE Busway

Seattle: CBD Bus Tunnel
Running Way Guidance

Optical
Rouen, France

Mechanical
Leeds, UK
Vehicles

- Rubber-tired, steered and/or guided
- Variety of sizes through 80+ feet
- Conventional buses or special BRT vehicles
- Environmentally friendly
  - Low emissions
  - Quiet
BRT Vehicle Options

Conventional
Van Hool 300AG
Zuidtangent
Amsterdam

Specialized
Irisbus Civis
Clean-Diesel/Electric
Las Vegas MAX
BRT Vehicles
Well-Lit, Open, Quiet Interior

Van Hool 300AG
Fare Collection

? Needs to facilitate multiple stream boarding
- Off-board (preferred)
- On-board multi-point payment
- Significant pass utilization

? Integrated with but may not be the same as for local bus system
Off-Board Fare Collection Options

Access Control: Magnetic Card
Bogota: Transmilenio

Proof-of Payment: TVM
Paris: Val de Marne
ITS

- Automatic vehicle location
- Passenger information
- Safety, security
- Signal priority
- Communications
- Fare collection
- Vehicle guidance and control
Central Control Room
Vehicle Location, Service Supervision

Brisbane SE Busway
Station Security

Brisbane SE Busway
Passenger Information

At Stations
LA: Metro Rapid Bus

On Board
Paris: Val de Marne Busway
Service Plan

• **All-day, Frequent Service**
  – 8-10 Minutes Or Better In Peaks

• **No Schedule Needed**

• **Simple Route Structure**
  – Direct, Easy To Understand

• **Use BRT Flexibility**
  – Maximize Directness, Minimize Transfers
BRT Service Plan Options: Simple End

All-day, local all-(limited) stop trunk line
BRT Service Plan Options

- **Base**: All-day, local all-stop trunk line
- **Overlay**: Peak only or all-day express services
BRT Service Plan Options: Most Complex

- **Base:** all-day, local all-stop trunk line
- **Peak-only or all-day integrated services**

All Stops, Local Trunk Line

Integrated Neighborhood Circulation, Line-Haul

Integrated Neighborhood Circulation, Line-Haul
Conveying System Identity & Image

• Vehicles:
  – Design, colors, graphics, signage

• Stops, Stations, Terminals:
  – Design, colors, graphics, signage, materials

• Running Ways:
  – Barriers, pavement markings/materials/colors, graphics, signage, landscaping
Consistent, Unique Station Design

York Rapid Transit
York (Toronto) Ontario
Unique Vehicle Livery

"98 B-Line" BRT

"99 B-Line" BRT

Regular Vancouver TransLink Bus
Consistent, Unique Graphics

Brisbane: S.E. Busway
Running Way Color, Markings

Paris

Auckland

Sao Paulo
How is BRT Working?
RT Operating Speeds

- Operating Speeds by ROW Type – MPH

- Arterial Curb Bus Lanes
  - Limited Stops
  - 14-19 mph

- Surface/Freeway Busways
  - Express Routes
  - 40-50 mph

- Local Routes
  - 25-30 mph

- Surface/Freeway Busways (S. America)
  - 11-14 mph

- Arterial Median Busways (S. America)
## Significant Time Savings

Compared to Local Bus

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td><strong>Busways and Freeway Bus Lanes</strong></td>
<td><strong>32 – 47%</strong></td>
</tr>
<tr>
<td><strong>Bus Tunnel (Seattle)</strong></td>
<td><strong>33%</strong></td>
</tr>
<tr>
<td><strong>Arterial Street Busways / Bus Lanes</strong></td>
<td><strong>29 – 32 %</strong></td>
</tr>
</tbody>
</table>
### Modest Operating & Maintenance Costs

**Modest Operating & Maintenance Costs**

*Port Authority of Alleghany County, Pittsburgh*

<table>
<thead>
<tr>
<th></th>
<th>PAT West Busway</th>
<th>PAT LRT</th>
</tr>
</thead>
<tbody>
<tr>
<td>$/Rev.Veh.Mi.</td>
<td>$ 6.40</td>
<td>$ 15.25</td>
</tr>
<tr>
<td>$/Rev.Veh.Hr.</td>
<td>$81.90</td>
<td>$222.37</td>
</tr>
<tr>
<td>$/Pass.-Mi.</td>
<td>$ 0.65</td>
<td>$ 0.84</td>
</tr>
<tr>
<td>$/Brdng</td>
<td>$ 2.73</td>
<td>$ 3.78</td>
</tr>
</tbody>
</table>

* FTA Evaluation of Port Authority of Alleghany County West Busway Bus Rapid Transit Project, 4-2003
# Attractive to Customers

<table>
<thead>
<tr>
<th>Location</th>
<th>% Ridership Gain in Corridor</th>
<th>% of Ridership New Transit Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles</td>
<td>+40% (3 Yrs.)</td>
<td>&gt;30%</td>
</tr>
<tr>
<td>Miami</td>
<td>+70% (5 Yrs.)</td>
<td>&gt;50%</td>
</tr>
<tr>
<td>Brisbane</td>
<td>+60% (2 Yrs.)</td>
<td>47%</td>
</tr>
<tr>
<td>Vancvr., BC</td>
<td>+30% (2 Yrs.)</td>
<td>&gt;25%</td>
</tr>
<tr>
<td>Boston</td>
<td>+100% (18 months)</td>
<td>&gt;30%</td>
</tr>
<tr>
<td>Oakland</td>
<td>(10 months)</td>
<td>&gt;25%</td>
</tr>
</tbody>
</table>
Boston Silver Line: Prior Means of Transportation

<table>
<thead>
<tr>
<th>Prior Transportation Means</th>
<th>Percentage of Riders</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBTA Bus</td>
<td>67%</td>
</tr>
<tr>
<td>MBTA Subway</td>
<td>32%</td>
</tr>
<tr>
<td>Drove Alone</td>
<td>4%</td>
</tr>
<tr>
<td>Carpool</td>
<td>--</td>
</tr>
<tr>
<td>Walked</td>
<td>18%</td>
</tr>
<tr>
<td>Didn’t Make Trip</td>
<td>7%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
</tr>
</tbody>
</table>

*Adds up to greater than 100% because respondents that formerly used more than one mode gave multiple answers.*
## Attractive to Customers with a Choice*

<table>
<thead>
<tr>
<th>Houston Metro Services, Customers</th>
<th>% Riders with Household Incomes &gt; $50,000/Yr</th>
<th>% Riders with Household Incomes &gt; $75,000/Yr</th>
<th>% Riders from Households with &gt; 2 Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Park/Ride Services (Rubber-tired Commuter Rail)</td>
<td>70%</td>
<td>50%</td>
<td>61%</td>
</tr>
<tr>
<td>Local Bus</td>
<td>11%</td>
<td>-</td>
<td>16%</td>
</tr>
</tbody>
</table>

* 2002 On Board Survey
High Capacities Achieved

- Maximum Volumes*
  - Peak Hour, Peak Direction

<table>
<thead>
<tr>
<th></th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>25,000 / hour</td>
<td>Sao Paolo (Nova de Julio)</td>
</tr>
<tr>
<td></td>
<td>Bogotá Transmilenio</td>
</tr>
<tr>
<td></td>
<td>NYC Lincoln Tunnel XBL</td>
</tr>
<tr>
<td>15 – 20,000 / hour</td>
<td>Porto Alegre</td>
</tr>
<tr>
<td></td>
<td>Quito</td>
</tr>
<tr>
<td>10 – 15,000 / hour</td>
<td>Curitiba</td>
</tr>
<tr>
<td></td>
<td>Ottawa</td>
</tr>
<tr>
<td></td>
<td>Brisbane</td>
</tr>
</tbody>
</table>

* Highest LRT Volumes in U.S., approx. 10,000/Hr., Boston Green Line and San Francisco Muni Metro
Attractive to Developers, Owners

• Significant Urban Development Effects
  – Curitiba Surface Metro
  – Ottawa Transitway System
  – Pittsburgh East Busway
  – Denver: 16th Street Mall
  – Brisbane SE Busway
  – Boston Silver Line
Boston: MBTA Silver Line
$700 M Worth of Projects Along Line Since Construction Began
Boston MBTA:
Silver Line, Washington St.

New Mixed Use Development
Adjacent to Stations
Denver 16th St. Mall

New Entertainment Venues
Ottawa Transitways

St. Laurent Mall: Highest Grossing per Sq. Ft. In Ottawa, 30% Mode Share
• Brisbane: Southern Suburbs, available ... with owner, 5 minutes walk from Garden City, Busway etc. Looking for a mature reliable person with ... for 3 b/r townhouse Greenslopes. Walk to busway and Logan Road. $75 a week, airconditioning, LUG ...
Busway boosts house values

PROPERTY values along Brisbane’s South-East Busway have jumped as much as 20 per cent as buyers take advantage of railine-free travel to the city.

“Most other suburbs next door to these busway suburbs also performed well, however they did record percentage changes slightly below those near the busway,” REIQ president Mark Erimbile said.

The most outstanding jump was in Holland Park West, where values rose 20.86 percent.

The neighbouring suburb of Holland Park, which does not have direct busway access, rose 6.33 per cent.

The comparisons showed busway suburbs were performing above city-wide increases which have seen nearly all areas within 10km of the CBD improve in value.

Other neighbouring suburbs that did not perform as well include Mount Gravatt East, which recorded 4.78 percent compared with 0.23 percent in the busway suburb of Mount Gravatt East.

Queensland Transport recorded a “passenger boom” on the busway, with a 60 percent growth in passenger figures in the first six months, or about 48,000 passenger trips a day.

The figures also showed approximately 375,000 private vehicle trips were converted to public transport along the busway, which straddles the South East Freeway.

Property values also would increase if proposed extensions of the busway along northern and eastern routes went ahead, analysts said.

“Historically, housing has always followed public transport nodes. Those closer to public transport generally have high values,” Mr Cross said.

“A lot of investor stock in rental properties are considered worth more if they are close to public transport because they are easier to rent.”

The $135 million Inner Northern Busway is nearing completion, and the planned dedicated bus lanes will give passengers uninterrupted travel as far as Kedron.
BRT Urban Design Integration

Brisbane SE Busway Station
Lessons Learned
Lessons Learned (Apply to any Rapid Transit Mode)

? Use transportation planning process to sort out alternatives

? Serve demonstrated markets

? Match markets with service plans, running ways, vehicles, stations

? Begin integration with land use planning early
Lessons Learned Unique to BRT

• Work hard to inform public and decision-makers that BRT is a high quality, high performance RT option

• Plan For BRT As For Any Rapid Transit Mode (i.e., Use Rail Criteria)

• Recognize that there is no single BRT system prescription
Lessons Learned Unique to BRT

- Focus on system integration and identity
- Be willing to spend money on BRT
  - Maintain system integrity
  - Resist de-construction
END